CVD and MBE may both be applied to ELO, MBE based ELO is inherently different from CVD based ELO.

Significant advantages that MBE based ELO has over CVD based ELO are the ability to achieve a high ratio of ELO width to ELO thickness and to achieve a high controllability of this ratio. These advantages are obtained because MBE base ELO employs directional atomic and molecular beams, which greatly enhance the lateral growth rate compared to the vertical growth rate. On the other hand, CVD based ELO supplies atoms and molecules onto a growing surface randomly, rather than directionally, such that the width-to-thickness ratio is determined only by a growth anisotropy, which is not usually strong. However, with MBE based ELO, a strong anisotropy is possible by selectively directing the beam's angle of incidence.

Moreover, MBE based ELO provides the ability to grow a single crystalline film on a single crystalline substrate of a different material so that the dislocation density of the single crystalline film may be set to no more than $10^4/cm^2$, particularly to not more than $10^2/cm^2$. Although Tanaka discloses that a single crystalline film may be grown via CVD based ELO on a single crystalline substrate of a different material, the dislocation density achieved by such CVD based ELO is far worse than that achieved through MBE based ELO. More specifically,

Tanaka discloses that the dislocation density achieved by growing a GaN single crystalline film via CVD based ELO on a single crystalline substrate of sapphire is in the range of $10^4/cm^2$ to $10^5/cm^2$ (see Tanaka col. 15, lines 44-48, and col. 15, lines 27-41). Since dislocations degrade the quality of the developed film, MBE based ELO provides a far superior film to that achievable through CVD based ELO.

Additionally, MBE based ELO provides a high degree of thickness control when growing a single crystalline film because the thickness of the single crystalline film under fabrication can be monitored *in situ* by means of an electron beam (e.g., by measuring the frequency of RHEED intensity oscillation). Accordingly, MBE based ELO can control the thickness of the grown single crystalline film within the order of an atomic layer. This degree of precision is especially desirable for producing high performance laser diodes and other electronic and optical devices requiring a high-degree of thickness controllability.

Furthermore, it is noteworthy that CVD based ELO has been known to those skilled in the art since at least 1985 (see U.S. patent number 4,530,149). MBE has been known since at least 1972 (see US 3,680,001), and chemical beam epitaxy (CBE) has been known since 1987 (see US 4,699,085), as has atomic beam epitaxy (ABE) (see US 4,664,940).

However, an electronic search conducted through the Patent and Trademark Office's website did not reveal any patent with a filing date preceding Applicant's filing date that describes applying MBE, CBE, or ABE to epitaxial lateral overgrowth. The 15-year period between the related art teaching of applying CVD to ELO and the first apparent disclosure of applying MBE/CBE/ABE to ELO, made by Applicant, provides strong evidence of the non-obviousness of Applicant's achievement. The non-obviousness of Applicant's achievement seems all the more striking in light of the ostensible related art use of MBE for vertical epitaxial growth, as CVD is also used, prior to the development of CVD based ELO. Simply put, if CVD and MBE were known, prior to Applicant's filing date, to be equivalent for the purpose of developing ELO films, as proposed in the Office Action, it seems certain that at least one publication would have identified this equivalency in the 15-year period between the above-cited publication providing the teaching to apply CVD to ELO and Applicant's disclosure of applying MBE/CBE/ABE to ELO.

Applicant asserts that he is the first person to have applied MBE/CBE/ABE techniques to ELO. And the evidentiary record bears this out.

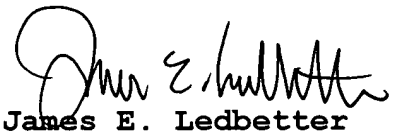
Accordingly, the Applicant submits that the applied references do not suggest the subject matter defined by claim 1.

More specifically, the applied references do not suggest applying MBE/CBE/ABE techniques to the development of ELO films, as recited in claim 1. Therefore, allowance of claim 1 and all claims dependent therefrom is warranted.

In view of the above, it is submitted that this application is in condition for allowance and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,



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JEL/DWW/att

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